Appendix A

Charcoal Canister Analyses Support Documents

CHARCOAL CANISTER ANALYSIS SYSTEM

SITE LOCATION: White Mesa Mill, Blanding, UT

CLIENT: Denison Mines (USA) Corp.

Calibration Check Log

System ID: M-02/D-20 Calibration Date: 6/09/12 Due Date: 6/09/13

Scaler S/N: 51563 High Voltage: 825 Window: 4.42 Thrshld: 2.20

Detector S/N: 041532 Source ID/SN: Ra^{226}/GS-04 Source Activity: 59.3 KpCi

Blank Canister Bkgd. Range, cpm: 2σ = 124 to 152 3σ = 117 to 159

Gross Source Range, cpm: 2σ = 10211 to 10605 3σ = 10113 to 10704

Technician: D L Cooper

All counts times are one minute.

Date	By	Background Counts (1 min. each)				Source Counts (1 min. each)				ck?
		#1	#2	#3	Avg.	#1	#2	#3	Average	Y/N
9/09/12	DLCooper	140	132	135	136	10582	10601	10533	10572	Y
9/09/12	DLCooper	133	138	139	137	10495	10580	10523	10533	Y
9/10/12	DLCooper	136	143	128	136	10587	10593	10584	10588	Y
9/10/12	DLCooper	137	144	141	141	10492	10557	10568	10539	Y

Y/N: Y = average background and source cpm falls within the control limits.
N = average background and source cpm does not fall within the control limits.

The acceptable ranges were determined from prior background and source check data.

CHARCOAL CANISTER ANALYSIS SYSTEM

SITE LOCATION: White Mesa Mill, Blanding, UT

CLIENT: Denison Mines (USA) Corp.

Calibration Check Log

System ID: M-02/D-20 Calibration Date: 6/09/12 Due Date: 6/09/13

Scaler S/N: 51563 High Voltage: 825 Window: 4.42 Thrshld: 2.20

Detector S/N: 041532 Source ID/SN: Ra^{226}/G5-05 Source Activity: 59.3 KpCi

Blank Canister Bkgd. Range, cpm: 2 σ = 124 to 152 3 σ = 117 to 159

Gross Source Range, cpm: 2 σ = 10031 to 10667 3 σ = 9872 to 10826

Technician: DL Cooper

All counts times are one minute.

Date	By	Background Counts (1 min. each)				Source Counts (1 min. each)				ok?
		#1	#2	#3	Avg.	#1	#2	#3	Average	Y/N
9/09/12	DLCoop	140	132	135	136	10537	10620	10563	10573	Y
9/09/12	DLCoop	133	138	139	137	10321	10525	10401	10416	Y
9/10/12	DLCoop	136	143	128	136	10611	10569	10635	10605	Y
9/10/12	DLCoop	137	144	141	141	10498	10553	10663	10571	Y

Y/N: Y = average background and source cpm falls within the control limits.
N = average background and source cpm does not fall within the control limits.

The acceptable ranges were determined from prior background and source check data.

CHARCOAL CANISTER ANALYSIS SYSTEM

SITE LOCATION: White Mesa Mill, Blanding, UT

CLIENT: Denison Mines (USA) Corp

Calibration Check Log

System ID: M-01 / D-21 Calibration Date: 6/09/12 Due Date: 6/09/13

Scaler S/N: 51572 High Voltage: 1125 Window: 4.42 Thrshld: 2.20

Detector S/N: 041533 Source ID/SN: Ra^{224}/GS-04 Source Activity: 59.3 KpCi

Blank Canister Bkgd. Range, cpm: 2 σ = 119 to 158 3 σ = 110 to 167

Gross Source Range, cpm: 2 σ = 10095 to 10481 3 σ = 9998 to 10578

Technician: DL Cogar

All counts times are one minute.

Date	By	Background Counts (1 min. each)				Source Counts (1 min. each)				ok?
		#1	#2	#3	Avg.	#1	#2	#3	Average	Y/N
9/09/12	DLCogar	131	147	125	134	10392	10272	10195	10286	Y
9/09/12	DLCogar	145	123	148	139	10149	10367	10368	10295	Y
9/10/12	DLCogar	149	129	125	134	10324	10124	10389	10279	Y
9/10/12	DLCogar	122	133	129	128	10374	10297	10285	10319	Y

Y/N: Y = average background and source cpm falls within the control limits.
N = average background and source cpm does not fall within the control limits.

The acceptable ranges were determined from prior background and source check data

CHARCOAL CANISTER ANALYSIS SYSTEM

SITE LOCATION: White Mesa Mill, Blanding, UT

CLIENT: Denison Mines (USA) Corp.

Calibration Check Log

System ID: M-01/D-21 Calibration Date: 6/09/12 Due Date: 6/09/13

Scaler S/N: 51572 High Voltage: 1125 Window: 4.42 Thrshld: 2.20

Detector S/N: 041533 Source ID/SN: Ra^{226}/GS-05 Source Activity: 59.3 K pCi

Blank Canister Bkgd. Range, cpm: 2 σ = 119 to 158 3 σ = 110 to 167

Gross Source Range, cpm: 2 σ = 10059 to 10423 3 σ = 9968 to 10514

Technician: DL Coop

All counts times are one minute.

Date	By	Background Counts (1 min. each)				Source Counts (1 min. each)				ok?
		#1	#2	#3	Avg.	#1	#2	#3	Average	Y/N
9/09/12	DLCoop	131	147	125	134	10300	10276	10325	10300	Y
9/09/12	DLCoop	145	123	148	139	10164	10278	10405	10282	Y
9/10/12	DLCoop	149	129	125	134	10338	10283	10276	10299	Y
9/10/12	DLCoop	122	133	129	128	10154	10199	10384	10246	Y

Y/N: Y = average background and source cpm falls within the control limits.
N = average background and source cpm does not fall within the control limits.

The acceptable ranges were determined from prior background and source check data.

Appendix B

Recount Data Analyses

CLIENT: ENERGY FUELS RESOURCES PROJECT: RADON FLUX MEASUREMENTS, WHITE MESA MILL PROJECT NO.: 12004.00

PILE: 2 BATCH: H SURFACE: SOIL AIR TEMP MIN: 55°F WEATHER: NO RAIN
AREA: COVER DEPLOYED: 9 8 12 RETRIEVED: 9 9 12 CHARCOAL BKG: 148 cpm Wt. Out: 180.0 g.
FIELD TECHNICIANS: CS,MC,DLC COUNTED BY: DLC DATA ENTRY BY: DLC TARE WEIGHT: 29.2 g.
COUNTING SYSTEM I.D.: M01/D21, M02/D20 CAL. DUE: 6/10/13

GRID LOCATION	SAMPLE I. D.	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	CNT (MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	PRECISION % RPD
H10	H10	8	40	9	9	12	20	32	1	25564	218.3	38.2	3.8	0.03	
RECOUNT	H10	8	40	9	10	12	7	49	1	22425	218.3	36.9	3.7	0.03	3.5%
H20	H20	8	55	9	9	12	20	39	1	7691	215.6	11.4	1.1	0.03	
RECOUNT	H20	8	55	9	10	12	7	49	1	6859	215.6	11.0	1.1	0.03	3.6%
H30	H30	9	12	9	9	12	20	46	1	31945	218.8	48.2	4.8	0.03	
RECOUNT	H30	9	12	9	10	12	7	51	1	29006	218.8	48.0	4.8	0.03	0.4%
H40	H40	8	57	9	9	12	20	52	1	41579	212.1	62.6	6.3	0.03	
RECOUNT	H40	8	57	9	10	12	7	51	1	38928	212.1	63.7	6.4	0.03	1.7%
H50	H50	9	42	9	9	12	20	59	1	11385	219.0	17.1	1.7	0.03	
RECOUNT	H50	9	42	9	10	12	7	52	1	9897	219.0	16.3	1.6	0.03	4.8%
H60	H60	9	27	9	9	12	21	6	1	1715	217.1	2.4	0.2	0.03	
RECOUNT	H60	9	27	9	10	12	7	52	1	1574	217.1	2.4	0.2	0.03	0.0%
H70	H70	9	22	9	9	12	21	13	1	10363	217.4	15.6	1.6	0.03	
RECOUNT	H70	9	22	9	10	12	7	54	1	9509	217.4	15.6	1.6	0.03	0.0%
H80	H80	9	3	9	9	12	21	25	2	1411	216.5	0.8	0.1	0.03	
RECOUNT	H80	9	3	9	10	12	7	54	2	1323	216.5	0.8	0.1	0.03	0.0%
H90	H90	8	37	8	9	12	21	34	2	1123	220.6	0.6	0.1	0.03	
RECOUNT	H90	8	37	8	10	12	7	58	2	1028	220.6	0.6	0.1	0.03	0.0%
H100	H100	8	33	8	9	12	21	43	1	1131	214.2	1.5	0.2	0.03	
RECOUNT	H100	8	33	8	10	12	7	57	1	1139	214.2	1.6	0.2	0.03	6.5%
														AVERAGE PERCENT PRECISION FOR THE CELL 2 COVER REGION:	2.0%

Appendix C

Radon Flux Sample Laboratory Data (including Blanks)

CLIENT: ENERGY FUELS RESOURCES PROJECT: RADON FLUX MEASUREMENTS, WHITE MESA MILL PROJECT NO.: 12004.00

PILE: 2 BATCH: H SURFACE: SOIL AIR TEMP MIN: 55°F WEATHER: NO RAIN
AREA: COVER DEPLOYED: 9 8 12 RETRIEVED: 9 9 12 CHARCOAL BKG: 148 cpm Wt. Out: 180.0 g.
FIELD TECHNICIANS: CS,MC,DLC COUNTED BY: DLC DATA ENTRY BY: DLC TARE WEIGHT: 29.2 g.
COUNTING SYSTEM I.D.: M01/D21, M02/D20 CAL. DUE: 6/10/13

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	CNT (MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	COMMENTS:
H01	H01	8	27	8	52	9	9	12	20	25	1	4010	214.3	5.9	0.6	0.03	
H02	H02	8	28	8	53	9	9	12	20	25	1	14468	214.4	21.5	2.1	0.03	
H03	H03	8	30	8	54	9	9	12	20	26	1	27459	220.6	41.4	4.1	0.03	
H04	H04	8	31	8	55	9	9	12	20	26	1	2392	219.0	3.4	0.3	0.03	
H05	H05	8	33	8	55	9	9	12	20	28	2	1316	217.2	0.8	0.1	0.03	
H06	H06	8	34	8	56	9	9	12	20	29	1	1640	215.9	2.2	0.2	0.03	
H07	H07	8	36	8	57	9	9	12	20	31	1	2395	214.7	3.4	0.3	0.03	
H08	H08	8	37	8	58	9	9	12	20	31	1	18140	216.4	27.0	2.7	0.03	
H09	H09	8	39	8	59	9	9	12	20	32	1	2346	222.6	3.3	0.3	0.03	
H10	H10	8	40	9	0	9	9	12	20	32	1	25564	218.3	38.2	3.8	0.03	
H11	H11	8	42	9	1	9	9	12	20	34	1	9428	219.9	14.1	1.4	0.03	
H12	H12	8	43	9	1	9	9	12	20	34	1	8180	216.7	12.1	1.2	0.03	
H13	H13	8	45	9	2	9	9	12	20	35	1	17410	214.1	26.3	2.6	0.03	
H14	H14	8	46	9	3	9	9	12	20	35	1	15174	213.8	22.6	2.3	0.03	
H15	H15	8	48	9	4	9	9	12	20	37	1	9188	213.7	13.8	1.4	0.03	
H16	H16	8	49	9	5	9	9	12	20	37	1	30712	216.1	46.1	4.6	0.03	
H17	H17	8	51	9	6	9	9	12	20	38	1	28002	217.4	42.5	4.2	0.03	
H18	H18	8	52	9	7	9	9	12	20	38	1	2352	213.0	3.3	0.3	0.03	
H19	H19	8	54	9	8	9	9	12	20	39	1	19664	214.6	29.8	3.0	0.03	
H20	H20	8	55	9	9	9	9	12	20	39	1	7691	215.6	11.4	1.1	0.03	
H21	H21	9	25	9	27	9	9	12	20	41	1	2830	217.6	4.1	0.4	0.03	
H22	H22	9	24	9	26	9	9	12	20	41	1	12598	215.7	18.9	1.9	0.03	
H23	H23	9	22	9	25	9	9	12	20	42	1	1569	216.8	2.2	0.2	0.03	
H24	H24	9	21	9	24	9	9	12	20	42	1	26833	213.9	40.5	4.0	0.03	
H25	H25	9	19	9	23	9	9	12	20	43	1	15649	216.5	23.8	2.4	0.03	
H26	H26	9	18	9	22	9	9	12	20	43	1	28361	218.9	42.8	4.3	0.03	
H27	H27	9	16	9	21	9	9	12	20	44	1	3865	216.5	5.7	0.6	0.03	
H28	H28	9	15	9	21	9	9	12	20	44	1	42212	217.3	63.7	6.4	0.03	
H29	H29	9	13	9	20	9	9	12	20	46	1	25811	219.5	39.3	3.9	0.03	
H30	H30	9	12	9	19	9	9	12	20	46	1	31945	218.8	48.2	4.8	0.03	
H31	H31	9	10	9	18	9	9	12	20	47	1	14370	216.3	21.8	2.2	0.03	
H32	H32	9	9	9	17	9	9	12	20	47	1	50079	218.5	75.6	7.6	0.03	
H33	H33	9	7	9	16	9	9	12	20	48	1	9917	218.6	14.9	1.5	0.03	
H34	H34	9	6	9	15	9	9	12	20	48	1	29644	220.4	44.6	4.5	0.03	

CLIENT: ENERGY FUELS RESOURCES PROJECT: RADON FLUX MEASUREMENTS, WHITE MESA MILL PROJECT NO.: 12004.00

PILE: 2 BATCH: H SURFACE: SOIL AIR TEMP MIN: 55°F WEATHER: NO RAIN
AREA: COVER DEPLOYED: 9 8 12 RETRIEVED: 9 9 12 CHARCOAL BKG: 148 cpm Wt. Out: 180.0 g.
FIELD TECHNICIANS: CS,MC,DLC COUNTED BY: DLC DATA ENTRY BY: DLC TARE WEIGHT: 29.2 g.
COUNTING SYSTEM I.D.: M01/D21, M02/D20 CAL. DUE: 6/10/13

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	CNT (MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	COMMENTS:
H35	H35	9	4	9	14	9	9	12	20	50	1	3094	219.0	4.5	0.5	0.03	
H36	H36	9	3	9	14	9	9	12	20	50	1	41126	213.9	62.0	6.2	0.03	
H37	H37	9	1	9	13	9	9	12	20	51	1	22637	217.7	34.4	3.4	0.03	
H38	H38	9	0	9	12	9	9	12	20	51	1	32569	213.0	49.0	4.9	0.03	
H39	H39	8	58	9	11	9	9	12	20	52	1	39760	214.4	60.5	6.1	0.03	
H40	H40	8	57	9	10	9	9	12	20	52	1	41579	212.1	62.6	6.3	0.03	
H41	H41	9	55	9	43	9	9	12	20	54	1	44131	216.0	68.0	6.8	0.03	
H42	H42	9	54	9	43	9	9	12	20	54	1	11231	217.9	16.9	1.7	0.03	
H43	H43	9	52	9	42	9	9	12	20	55	1	10895	217.1	16.6	1.7	0.03	
H44	H44	9	51	9	41	9	9	12	20	55	1	58806	214.8	89.6	9.0	0.03	
H45	H45	9	49	9	41	9	9	12	20	56	1	68353	213.1	105.3	10.5	0.03	
H46	H46	9	48	9	40	9	9	12	20	56	1	3797	215.9	5.6	0.6	0.03	
H47	H47	9	46	9	39	9	9	12	20	58	1	16055	218.6	24.5	2.5	0.03	
H48	H48	9	45	9	38	9	9	12	20	58	1	1761	217.3	2.5	0.2	0.03	
H49	H49	9	43	9	37	9	9	12	20	59	1	17985	212.2	27.5	2.8	0.03	
H50	H50	9	42	9	37	9	9	12	20	59	1	11385	219.0	17.1	1.7	0.03	
H51	H51	9	40	9	36	9	9	12	21	0	1	40883	216.7	62.8	6.3	0.03	
H52	H52	9	39	9	35	9	9	12	21	0	1	17192	221.7	26.0	2.6	0.03	
H53	H53	9	37	9	34	9	9	12	21	2	1	112824	216.4	173.6	17.4	0.03	
H54	H54	9	36	9	33	9	9	12	21	2	1	39893	222.9	60.6	6.1	0.03	
H55	H55	9	34	9	32	9	9	12	21	3	1	4527	222.0	6.7	0.7	0.03	
H56	H56	9	33	9	32	9	9	12	21	3	1	155050	216.5	235.9	23.6	0.03	
H57	H57	9	31	9	31	9	9	12	21	4	1	7658	218.6	11.6	1.2	0.03	
H58	H58	9	30	9	30	9	9	12	21	4	1	19298	214.1	29.2	2.9	0.03	
H59	H59	9	28	9	29	9	9	12	21	6	2	1323	220.1	0.8	0.1	0.03	
H60	H60	9	27	9	28	9	9	12	21	6	1	1715	217.1	2.4	0.2	0.03	
H61	H61	9	9	9	17	9	9	12	21	8	1	5859	219.6	8.8	0.9	0.03	
H62	H62	9	10	9	18	9	9	12	21	8	1	4107	216.2	6.0	0.6	0.03	
H63	H63	9	12	9	19	9	9	12	21	9	1	2448	215.4	3.5	0.4	0.03	
H64	H64	9	13	9	20	9	9	12	21	9	1	60642	216.7	91.9	9.2	0.03	
H65	H65	9	15	9	21	9	9	12	21	11	1	17889	213.6	27.3	2.7	0.03	
H66	H66	9	16	9	22	9	9	12	21	11	1	21495	216.4	32.4	3.2	0.03	
H67	H67	9	18	9	23	9	9	12	21	12	1	26416	215.3	40.4	4.0	0.03	
H68	H68	9	19	9	24	9	9	12	21	12	1	3454	215.7	5.0	0.5	0.03	

CLIENT: ENERGY FUELS RESOURCES PROJECT: RADON FLUX MEASUREMENTS, WHITE MESA MILL PROJECT NO.: 12004.00

PILE: 2 BATCH: H SURFACE: SOIL AIR TEMP MIN: 55°F WEATHER: NO RAIN
AREA: COVER DEPLOYED: 9 8 12 RETRIEVED: 9 9 12 CHARCOAL BKG: 148 cpm Wt. Out: 180.0 g.
FIELD TECHNICIANS: CS,MC,DLC COUNTED BY: DLC DATA ENTRY BY: DLC TARE WEIGHT: 29.2 g.
COUNTING SYSTEM I.D.: M01/D21, M02/D20 CAL. DUE: 6/10/13

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	CNT (MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	COMMENTS:
H69	H69	9	21	9	25	9	9	12	21	13	1	4504	218.4	6.7	0.7	0.03	
H70	H70	9	22	9	26	9	9	12	21	13	1	10363	217.4	15.5	1.6	0.03	
H71	H71	9	24	9	27	9	9	12	21	15	1	16101	223.7	24.6	2.5	0.03	
H72	H72	9	25	9	28	9	9	12	21	15	1	25537	221.3	38.6	3.9	0.03	
H73	H73	9	27	9	29	9	9	12	21	17	1	6054	220.7	9.1	0.9	0.03	
H74	H74	9	28	9	30	9	9	12	21	17	1	13528	215.4	20.4	2.0	0.03	
H75	H75	9	30	9	31	9	9	12	21	19	1	1254	220.1	1.7	0.2	0.03	
H76	H76	9	31	9	32	9	9	12	21	19	1	1496	215.7	2.1	0.2	0.03	
H77	H77	9	7	9	16	9	9	12	21	21	1	45654	213.0	69.9	7.0	0.03	
H78	H78	9	6	9	15	9	9	12	21	22	2	1376	218.1	0.8	0.1	0.03	
H79	H79	9	4	9	14	9	9	12	21	24	1	4706	214.6	7.0	0.7	0.03	
H80	H80	9	3	9	13	9	9	12	21	25	2	1411	216.5	0.8	0.1	0.03	
H81	H81	9	1	9	12	9	9	12	21	27	1	4851	217.8	7.2	0.7	0.03	
H82	H82	9	0	9	11	9	9	12	21	27	1	18234	215.0	27.5	2.7	0.03	
H83	H83	8	58	9	10	9	9	12	21	29	1	16722	217.4	25.5	2.5	0.03	
H84	H84	8	57	9	9	9	9	12	21	29	1	2016	218.3	2.8	0.3	0.03	
H85	H85	8	55	9	8	9	9	12	21	30	1	4548	215.6	6.8	0.7	0.03	
H86	H86	8	54	9	7	9	9	12	21	30	1	3021	218.4	4.4	0.4	0.03	
H87	H87	8	52	9	6	9	9	12	21	32	1	2785	217.6	4.1	0.4	0.03	
H88	H88	8	51	9	5	9	9	12	21	32	1	4295	216.1	6.3	0.6	0.03	
H89	H89	8	36	8	56	9	9	12	21	33	1	4951	214.7	7.4	0.7	0.03	
H90	H90	8	37	8	57	9	9	12	21	34	2	1123	220.6	0.6	0.1	0.03	
H91	H91	8	39	8	58	9	9	12	21	37	2	1225	217.7	0.7	0.1	0.03	
H92	H92	8	40	8	59	9	9	12	21	36	1	1582	230.8	2.2	0.2	0.03	
H93	H93	8	42	9	0	9	9	12	21	39	1	5204	216.8	7.8	0.8	0.03	
H94	H94	8	43	9	1	9	9	12	21	39	1	4205	218.3	6.2	0.6	0.03	
H95	H95	8	45	9	2	9	9	12	21	40	1	3700	216.6	5.5	0.5	0.03	
H96	H96	8	46	9	3	9	9	12	21	40	1	3809	215.9	5.6	0.6	0.03	
H97	H97	8	48	9	4	9	9	12	21	42	1	23703	215.5	36.2	3.6	0.03	
H98	H98	8	30	8	55	9	9	12	21	42	1	10320	217.9	15.4	1.5	0.03	
H99	H99	8	31	8	54	9	9	12	21	43	1	1339	215.9	1.8	0.2	0.03	
H100	H100	8	33	8	53	9	9	12	21	43	1	1131	214.2	1.5	0.1	0.03	

AVERAGE RADON FLUX RATE FOR THE CELL 2 COVER REGION: 26.6 pCi/m²s

CLIENT: ENERGY FUELS RESOURCES PROJECT: RADON FLUX MEASUREMENTS, WHITE MESA MILL PROJECT NO.: 12004.00

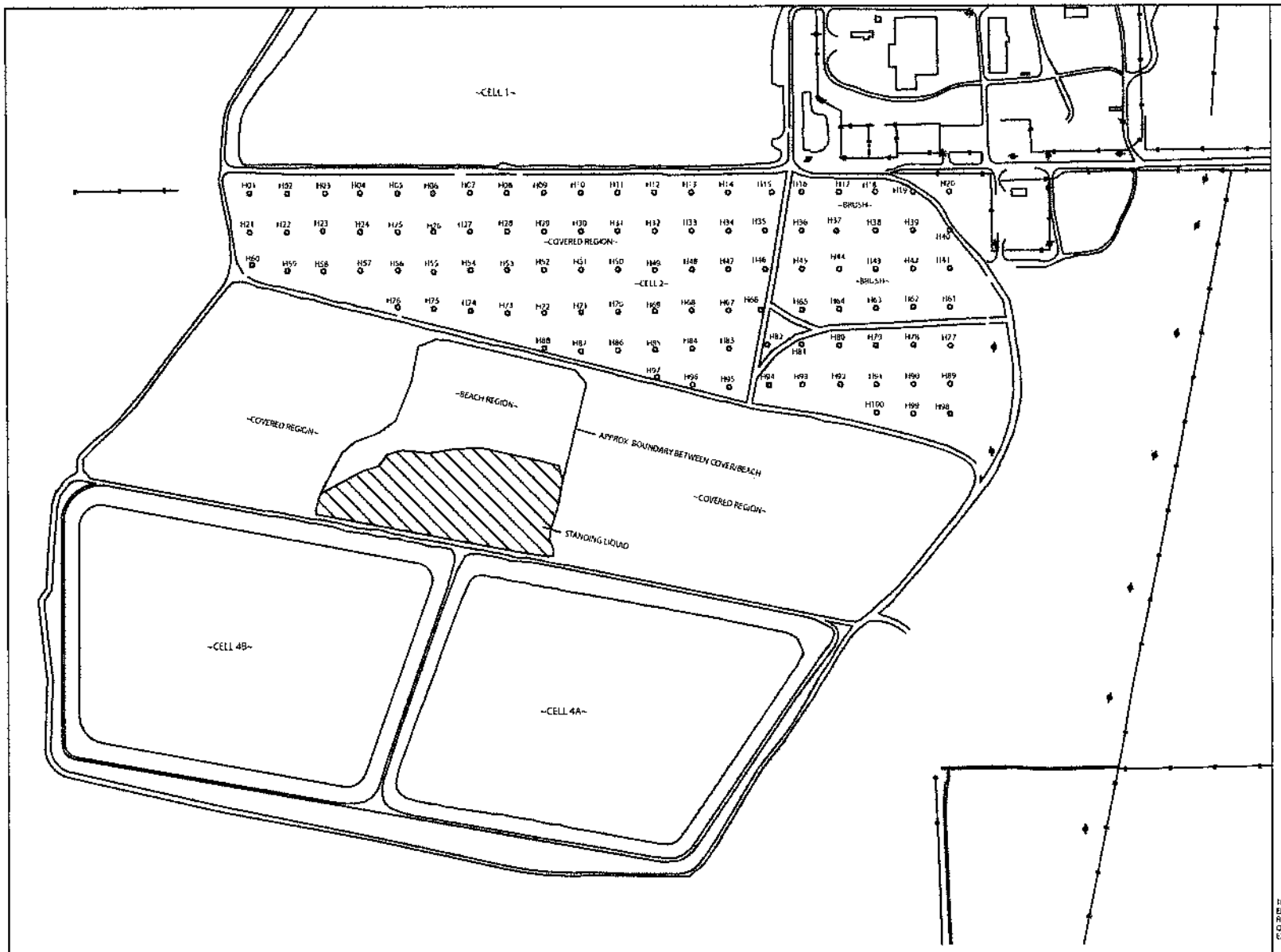
PILE: 2 BATCH: H SURFACE: SOIL AIR TEMP MIN: 55°F WEATHER: NO RAIN
AREA: COVER DEPLOYED: 9 8 12 RETRIEVED: 9 9 12 CHARCOAL BKG: 148 cpm Wt. Out: 180.0 g.
FIELD TECHNICIANS: CS,MC,DLC COUNTED BY: DLC DATA ENTRY BY: DLC TARE WEIGHT: 29.2 g.
COUNTING SYSTEM I.D.: M01/D21, M02/D20 CAL. DUE: 6/10/13

GRID LOCATION	SAMPLE I. D.	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	CNT (MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	COMMENTS:
H BLANK 1	H BLANK 1	8	25	9	9	12	21	49	10	1750	209.5	0.04	0.02	0.03	CONTROL
H BLANK 2	H BLANK 2	8	25	9	9	12	21	49	10	1626	210.5	0.02	0.02	0.03	CONTROL
H BLANK 3	H BLANK 3	8	25	9	9	12	22	0	10	1779	209.4	0.05	0.02	0.03	CONTROL
H BLANK 4	H BLANK 4	8	25	9	9	12	22	0	10	1671	207.4	0.03	0.02	0.03	CONTROL
H BLANK 5	H BLANK 5	8	25	9	9	12	22	12	10	1656	208.2	0.03	0.02	0.03	CONTROL

AVERAGE BLANK CANISTER ANALYSIS FOR THE CELL 2 COVER REGION: 0.03 pCi/m²s

Appendix D

Sample Locations Map (Figure 2)



WHITE MESA MILL

BLANDING, UTAH

NESHAPS 2012

SEPTEMBER 2012 SAMPLING

PREPARED FOR
ENERGY FUELS RESOURCES

LEGEND

H01 ⊗ SAMPLE LOCATION ON COVERED AREAS

FIGURE 2

SCALE IN FEET

200 100 0 200 400

TELLCO
ENVIRONMENTAL, LLC

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ATTACHMENT 1C

Tellco Report on Annual Radon Flux Monitoring
October 2012

National Emission Standards for Hazardous Air Pollutants
2012 Radon Flux Measurement Program
White Mesa Mill
6425 South Highway 191
Blanding, Utah 84511

October 2012 Sampling Results

Prepared for: Energy Fuels Resources (USA) Inc.
6425 S. Highway 191
P.O. Box 809
Blanding, Utah 84511

Prepared by: Tellco Environmental
P.O. Box 3987
Grand Junction, Colorado 81502

TABLE OF CONTENTS

1. INTRODUCTION

During October 20-21, 2012, Tellco Environmental, LLC (Tellco) of Grand Junction, Colorado, provided support to Energy Fuels Resources (USA) Inc. (Energy Fuels) to conduct additional radon flux measurements regarding the required National Emission Standards for Hazardous Air Pollutants (NESHAPs) Radon Flux Measurements. These measurements are required of Energy Fuels to show compliance with Federal Regulations (further discussed in Section 3 below). The standard is not an average per facility, but is an average per radon source. The standard allows mill owners or operators the option of either making a single set of measurements or making measurements over a one year period (e.g., weekly, monthly, or quarterly intervals).

Radon flux measurements were initially performed in June 2012 on Cell 2 and Cell 3 with the intention of performing a single set of measurements to represent the year 2012 as allowed by the regulations (Method 115). The results of the June 2012 sampling (presented in a separate report) measured an arithmetic average radon flux rate of 23.1 picoCuries per square meter per second (pCi/m2-s) for Cell 2 and 18.0 pCi/m2-s for Cell 3. Because the results for Cell 2 exceeded the regulatory standard of 20 pCi/m2-s, Energy Fuels directed Tellco to perform additional radon flux measurements of Cell 2 in September, October, and November 2012. This report addresses the results of the October 2012 sampling while the June, September, and November 2012 sampling results are each presented in separate reports. No additional sampling of Cell 3 was performed because the average radon flux rate measured by the June 2012 sampling was below the regulatory standard.

Tellco was contracted to provide radon canisters, equipment, and canister placement personnel as well as lab analysis of samples for calendar year 2012. Energy Fuels personnel provided support for loading and unloading charcoal from the canisters. This report includes the procedures employed by Energy Fuels and Tellco to obtain the results presented in Section 9.0 of this report.

2. SITE DESCRIPTION

The White Mesa Mill facility is located in San Juan County in southeastern Utah, six miles south of Blanding, Utah. The mill began operations in 1980 for the purpose of extracting uranium and vanadium from feed stocks. Processing effluents from the operation are deposited in four lined cells, which vary in depth. Cell 1, Cell 4A, and Cell 4B did not require radon flux sampling, as explained in Section 3 below.

Cell 2, which has a total area of approximately 270,624 square meters (m^2), has been filled and covered with interim cover. This cell was comprised of one region; a soil cover of varying thickness, which required NESHAPs radon flux monitoring. The Cell 2 cover region was the same size in 2012 as it was in 2011. There were no exposed tailings or standing liquid within Cell 2.

Cell 3, which has a total area of 288,858 m^2, is nearly filled with tailings sand and is undergoing pre-closure activities. This cell was comprised of two source regions that required NESHAPs radon monitoring: at the time of the June 2012 radon sampling, approximately 219,054 m^2 of the cell had a soil cover of varying thickness and approximately 36,233 m^2 of exposed tailings "beaches". The remaining approximately 33,571 m^2 was covered by standing liquid in lower elevation areas. The

standing liquid area was much smaller than in 2011. Raffinate crystals and residue from the repair of the original Cell 4A in 2006 have been placed in Cell 3.

The Cell 3 cover region area was larger during the 2012 radon flux sampling than it was for the 2011 sampling program. Due to worker health and safety concerns by both Energy Fuels and Tellco personnel, portions of the unstable and wet beaches and covered areas were not sampled. The areas tested for radon emanation are representative of the disposition of tailings for the 2012 reporting period.

3. REGULATORY REQUIREMENTS FOR THE SITE

Radon emissions from the uranium mill tailings at this site are regulated by the State of Utah's Division of Radiation Control and administered by the Utah Division of Air Quality under generally applicable standards set by the Environmental Protection Agency (EPA) for Operating Mills. Applicable regulations are specified in 40 CFR Part 61, Subpart W, National Emission Standards for Radon Emissions from Operating Mill Tailings, with technical procedures in Appendix B. At present, there are no Subpart T uranium mill tailings at this site. These regulations are a subset of the NESHAPs. According to subsection 61.252 Standard, (a) radon-222 emissions to ambient air from an existing uranium mill tailings pile shall not exceed an average of 20 picoCuries per square meter per second (pCi/m2-s) for each pile or region. Subsection 61.253, Determining Compliance, states that: "Compliance with the emission standard in this subpart shall be determined annually through the use of Method 115 of Appendix B." The repaired Cell 4A, and newly constructed Cell 4B, were both constructed after December 15, 1989 and each was constructed with less than 40 acres surface area. Cell 4A and 4B comply with the requirements of 40 CFR 61.252(b), therefore no radon flux measurements are required on either Cell 4A or 4B.

4. SAMPLING METHODOLOGY

Radon emissions were measured using Large Area Activated Charcoal Canisters (canisters) in conformance with 40 CFR, Part 61, Appendix B, Method 115, Restrictions to Radon Flux Measurements, (EPA, 2012). These are passive gas adsorption sampling devices used to determine the flux rate of radon-222 gas from a surface. The canisters were constructed using a 10-inch diameter PVC end cap containing a bed of 180 grams of activated, granular charcoal. The prepared charcoal was placed in the canisters on a support grid on top of a ½ inch thick layer of foam and secured with a retaining ring under 1½ inches of foam (see Figure 1, page 11).

One hundred sampling locations were distributed throughout Cell 2 (which consisted of one region) as depicted on the Sample Locations Map (see Figure 2, Appendix D). Each charged canister was placed directly onto the surface (open face down) and exposed to the surface for 24 hours. Radon gas adsorbed onto the charcoal and the subsequent radioactive decay of the entrained radon resulted in radioactive lead-214 and bismuth-214. These radon progeny isotopes emit characteristic gamma photons that can be detected through gamma spectroscopy. The original total activity of the adsorbed radon was calculated from these gamma ray measurements using calibration factors derived from cross-calibration of standard sources containing known total activities of radium-226 with geometry identical to the counted samples and from the principles of radioactive decay.

After 24 hours, the exposed charcoal was transferred to a sealed plastic sample container (to prevent radon loss and/or further exposure during transport), identified and labeled, and transported to the

Tellco laboratory in Grand Junction, Colorado for analysis. Upon completion of on-site activities, the field equipment was alpha and beta-gamma scanned for possible contamination resulting from fieldwork activities. All field equipment was surveyed by Energy Fuels Radiation Safety personnel and released for unrestricted use. Tellco personnel maintained custody of the samples from collection through analysis.

5. FIELD OPERATIONS

5.1 Equipment Preparation

All charcoal was dried at 110°C before use in the field. Unused charcoal and recycled charcoal were treated the same. 180-gram aliquots of dried charcoal were weighed and placed in sample containers.

Proper balance operation was verified daily by checking a standard weight. The balance readout agreed with the known standard weight to within ± 0.1 percent.

After acceptable balance check, empty containers were individually placed on the balance and the scale was re-zeroed with the container on the balance. Unexposed and dried charcoal was carefully added to the container until the readout registered 180 grams. The lid was immediately placed on the container and sealed with plastic tape. The balance was checked for readout drift between readings.

Sealed containers with unexposed charcoal were placed individually in the shielded counting well, with the bottom of the container centered over the detector, and the background count rate was documented. Three five-minute background counts were conducted on ten percent of the containers, selected at random to represent the "batch". If the background counts were too high to achieve an acceptable lower limit of detection (LLD), the entire charcoal batch was labeled non-conforming and recycled through the heating/drying process.

5.2 Sample Locations, Identification, and Placement

On October 20, 2012, the sampling locations were spread out throughout the Cell 2 region. The same original designated sample point locations that were established for the June 2012 sampling of Cell 2 were used for the October sampling. A sample identification number (ID) was assigned to every sample point, using a sequential alphanumeric system indicating the charcoal batch and physical location within the region (e.g., G01...G100). This ID was written on an adhesive label and affixed to the top of the canister. The sample ID, date, and time of placement were recorded on the radon flux measurements data sheets for the set of one hundred measurements.

Prior to placing a canister at each sample location, the retaining ring, screen, and foam pad of each canister were removed to expose the charcoal support grid. A pre-measured charcoal charge was selected from a batch, opened and distributed evenly across the support grid. The canister was then reassembled and placed face down on the surface at each sampling location. Care was exercised not to push the device into the soil surface. The canister rim was "sealed" to the surface using a berm of local borrow material.

Five canisters (blanks) were similarly processed and the canisters were kept inside an airtight plastic bag during the 24-hour testing period.

5.3 Sample Retrieval

On October 21, 2012 at the end of the 24-hour testing period, all canisters were retrieved, disassembled and each charcoal sample was individually poured through a funnel into a container. Identification numbers were transferred to the appropriate container, which was sealed and placed in a box for transport. Retrieval date and time were recorded on the same data sheets as the sample placement information. The blank samples were similarly processed.

All of the 100 canisters placed throughout the Cell 2 sampling region were successfully retrieved and all of the charcoal samples were successfully containerized during the unloading process.

5.4 Environmental Conditions

A rain gauge was in place at the White Mesa Mill site to monitor rainfall and air temperatures during sampling in order to ensure compliance with the regulatory measurement criteria.

In accordance with 40 CFR, Part 61, Appendix B, Method 115:

- Measurements were not initiated within 24 hours of rainfall.
- No rainfall occurred during any of the sampling periods.

6. SAMPLE ANALYSIS

6.1 Apparatus

Apparatus used for the analysis:

- Single- or multi-channel pulse height analysis system, Ludlum Model 2200 with a Teledyne 3" x 3" sodium iodide, thallium-activated (NaI(Tl)) detector.
- Lead shielded counting well approximately 40 cm deep with 5-cm thick lead walls and a 7-cm thick base and 5 cm thick top.
- National Institute of Standards and Technology (NIST) traceable aqueous solution radium-226 absorbed onto 180 grams of activated charcoal.
- Ohaus Model C501 balance with 0.1-gram sensitivity.

6.2 Sample Inspection and Documentation

Once in the laboratory, the integrity of each charcoal container was verified by visual inspection of the plastic container. Laboratory staff documented damaged or unsealed containers and verified that the data sheet was complete.

All of the 100 sample containers and 5 blank containers received and inspected at the Tellco analytical laboratory were verified as valid.

6.3 Background and Sample Counting

The gamma ray counting system was checked daily, including background and radium-226 source measurements prior to and after each counting session. Based on calibration statistics, using two sources with known radium-226 content, background and source control limits were established for each Ludlum/Teledyne counting system with shielded well (see Appendix A).

Gamma ray counting of exposed charcoal samples included the following steps:

- The length of count time was determined by the activity of the sample being analyzed, according to a data quality objective of a minimum of 1,000 accrued counts for any given sample.
- The sample container was centered on the NaI detector and the shielded well door was closed.
- The sample was counted over a determined count length and then the mid-sample count time, date, and gross counts were documented on the radon flux measurements data sheet and used in the calculations.
- The above steps were repeated for each exposed charcoal sample.
- Approximately 10 percent of the containers counted were selected for recounting. These containers were recounted within a few days following the original count.

7. QUALITY CONTROL (QC) AND DATA VALIDATION

Charcoal flux measurement QC samples included the following intra-laboratory analytical frequency objectives:

- Blanks, 5 percent, and
- Recounts, 10 percent

All sample data were subjected to validation protocols that included assessments of sensitivity, precision, accuracy, and completeness. All method-required data quality objectives (EPA, 2012) were attained.

7.1 Sensitivity

A total of five blanks were analyzed by measuring the radon progeny activity in samples subjected to all aspects of the measurement process, excepting exposure to the source region. These blank sample measurements comprised approximately 5 percent of the field measurements. The results of the blank sample radon flux rates ranged from 0.04 to 0.06 pCi/m^2-s, with an average of approximately 0.05 pCi/m^2-s.

7.2 Precision

Ten recount measurements, distributed throughout the sample set, were performed by replicating analyses of individual field samples (see Appendix B). These recount measurements comprised approximately 10 percent of the total number of samples analyzed. The precision of all recount

measurements, expressed as relative percent difference (RPD), ranged from less than 1 percent to 5.7 percent with an overall average precision of approximately 2.4 percent.

7.3 Accuracy

Accuracy of field measurements was assessed daily by counting two laboratory control samples with known Ra-226 content. Accuracy of these lab control sample measurements, expressed as percent bias, ranged from approximately -1.4 percent to +1.9 percent. The arithmetic average bias of the lab control sample measurements was approximately +0.0 percent (see Appendix A).

7.4 Completeness

One hundred samples from the Cell 2 Cover Region were verified, representing 100 percent completeness for the October 2012 radon flux sampling.

8. CALCULATIONS

Radon flux rates were calculated for charcoal collection samples using calibration factors derived from cross-calibration to sources with known total activity with identical geometry as the charcoal containers. A yield efficiency factor was used to calculate the total activity of the sample charcoal containers. Individual field sample result values presented were not reduced by the results of the field blank analyses.

In practice, radon flux rates were calculated by a database computer program. The algorithms utilized by the data base program were as follows:

Equation 8.1:

$$\text{pCi Rn-222/m}^2\text{sec} = \frac{N}{[Ts*A*b*0.5^{(d/91.75)}]}$$

where: N = net sample count rate, cpm under 220-662 keV peak
Ts = sample duration, seconds
b = instrument calibration factor, cpm per pCi; values used:
0.1708, for M-01/D-21 and
0.1727, for M-02/D-20
d = decay time, elapsed hours between sample mid-time and count mid-time
A = area of the canister, m^2

Equation 8.2:

$$\text{Error}, 2\sigma = 2 \times \frac{\sqrt{\frac{\text{Gross Sample, cpm}}{\text{Sample Count, t, min}} + \frac{\text{Background Sample, cpm}}{\text{Background Count, t, min}}}}{\text{Net, cpm}} \times \text{Sample Concentration}$$

Equation 8.3:

$$LLD = \frac{2.71 + (4.65)(S_b)}{[Ts*A*b*0.5^{(d/91.75)}]}$$

where: 2.71 = constant
4.65 = confidence interval factor
S_b = standard deviation of the background count rate
Ts = sample duration, seconds
b = instrument calibration factor, cpm per pCi; values used:
0.1708, for M-01/D-21 and
0.1727, for M-02/D-20
d = decay time, elapsed hours between sample mid-time and count mid-time
A = area of the canister, m^2

9. RESULTS

9.1 Mean Radon Flux

Referencing 40 CFR, Part 61, Subpart W, Appendix B, Method 115 - Monitoring for Radon-222 Emissions, Subsection 2.1.7 - Calculations, "the mean radon flux for each region of the pile and for the total pile shall be calculated and reported as follows:

(a) The individual radon flux calculations shall be made as provided in Appendix A EPA 86(1). The mean radon flux for each region of the pile shall be calculated by summing all individual flux measurements for the region and dividing by the total number of flux measurements for the region.

(b) The mean radon flux for the total uranium mill tailings pile shall be calculated as follows:

$$J_s = \frac{J_1A_1 + \ldots J_2A_2 [+] \ldots J_iA_i}{A_t}$$

Where: J_s = Mean flux for the total pile (pCi/m^2-s)
J_i = Mean flux measured in region i (pCi/m^2-s)
A_i = Area of region i (m^2)
A_t = Total area of the pile (m^2)"

40 CFR 61, Subpart W, Appendix B, Method 115, Subsection 2.1.8, Reporting states "The results of individual flux measurements, the approximate locations on the pile, and the mean radon flux for each region and the mean radon flux for the total stack [pile] shall be included in the emission test report. Any condition or unusual event that occurred during the measurements that could significantly affect the results should be reported."

9.2 Site Results

Site Specific Sample Results (reference Appendix C)

(a) The mean radon flux for each region within the site as follows:

Cell 2 - Cover Area = 27.7 pCi/m^2-s (based on 270,624 m^2 area)

Note: Reference Appendix C of this report for the entire summary of individual measurement results.

(b) Using the data presented above, the calculated mean radon flux for each cell (pile) is, as follows:

Cell 2 = 27.7 pCi/m^2-s

$$\frac{(27.7)(270,624)}{270,624} = 27.7$$

As shown above, the arithmetic mean radon flux of the October 2012 samples for Cell 2 at Energy Fuels White Mesa milling facility is slightly above the NRC and EPA standard of 20 pCi/m^2-s. The unusually dry weather which was especially severe in 2012 likely lowered the water table at the site as well as reducing the moisture content in surface soils. It is believed that this likely increased the radon flux rates over the previous years' reported results. Appendix C is a summary of individual measurement results, including blank sample analysis. Sample locations are depicted on Figure 2, which is included in Appendix D. The map was produced by Tellco.

References

U. S. Environmental Protection Agency, *Radon Flux Measurements on Gardinier and Royster Phosphogypsum Piles Near Tampa and Mulberry, Florida*, EPA 520/5-85-029, NTIS #PB86-161874, January 1986.

U. S. Environmental Protection Agency, *Title 40, Code of Federal Regulations*, July 2012.

U. S. Nuclear Regulatory Commission, *Radiological Effluent and Environmental Monitoring at Uranium Mills*, Regulatory Guide 4.14, April 1980.

U. S. Nuclear Regulatory Commission, *Title 10, Code of Federal Regulations*, Part 40, Appendix A, January 2012.

Figure 1

Large Area Activated Charcoal Canisters Diagram

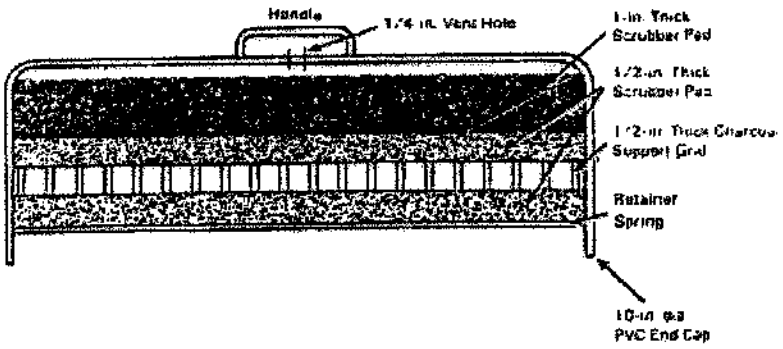


FIGURE 1 Large-Area Rason Collector

Appendix A

Charcoal Canister Analyses Support Documents

ACCURACY APPRAISAL TABLE
OCTOBER 2012 SAMPLING

ENERGY FUELS RESOURCES (USA) INC.
WHITE MESA MILL, BLANDING, UTAH
2012 NESHAPs RADON FLUX MEASUREMENTS
SAMPLING DATES: 10/20/12-10/21/12

SYSTEM I.D.	DATE	Bkg Counts (1 min. each)			Source Counts (1 min. each)			AVG NET	YIELD	FOUND	SOURCE	KNOWN	% BIAS
		#1	#2	#3	#1	#2	#3	cpm	cpm/pCi	pCi	ID	pCi	
M-01/D-21	10/21/2012	127	151	136	10346	10395	10371	10233	0.1708	59910	GS-04	59300	1.0%
M-01/D-21	10/21/2012	141	142	144	10416	10147	10201	10112	0.1708	59206	GS-04	59300	-0.2%
M-01/D-21	10/22/2012	144	131	145	10404	10253	10350	10196	0.1708	59694	GS-04	59300	0.7%
M-01/D-21	10/22/2012	127	150	153	10214	10160	10429	10124	0.1708	59276	GS-04	59300	0.0%
M-01/D-21	10/21/2012	127	151	136	10140	10206	10309	10080	0.1708	59018	GS-05	59300	-0.5%
M-01/D-21	10/21/2012	141	142	144	10223	10312	10195	10101	0.1708	59139	GS-05	59300	-0.3%
M-01/D-21	10/22/2012	144	131	145	10247	10295	10206	10109	0.1708	59188	GS-05	59300	-0.2%
M-01/D-21	10/22/2012	127	150	153	10154	10438	10236	10133	0.1708	59325	GS-05	59300	0.0%
M-02/D-20	10/21/2012	148	146	144	10603	10586	10569	10440	0.1727	60452	GS-04	59300	1.9%
M-02/D-20	10/21/2012	142	151	142	10318	10498	10302	10228	0.1727	59222	GS-04	59300	-0.1%
M-02/D-20	10/22/2012	136	124	130	10593	10247	10490	10313	0.1727	59718	GS-04	59300	0.7%
M-02/D-20	10/22/2012	140	126	125	10454	10361	10520	10315	0.1727	59726	GS-04	59300	0.7%
M-02/D-20	10/21/2012	148	146	144	10271	10230	10242	10102	0.1727	58493	GS-05	59300	-1.4%
M-02/D-20	10/21/2012	142	151	142	10178	10366	10350	10153	0.1727	58790	GS-05	59300	-0.9%
M-02/D-20	10/22/2012	136	124	130	10316	10254	10461	10214	0.1727	59141	GS-05	59300	-0.3%
M-02/D-20	10/22/2012	140	126	125	10332	10186	10255	10127	0.1727	58641	GS-05	59300	-1.1%
												AVERAGE PERCENT BIAS FOR ALL ANALYTICAL SESSIONS:	0.0%

CHARCOAL CANISTER ANALYSIS SYSTEM

SITE LOCATION: White Mesa Mill, Blanding, UT

CLIENT: Energy Fuels Resources

Calibration Check Log

System ID: M-01/D-21 Calibration Date: 6/09/12 Due Date: 6/09/13

Scaler S/N: 51572 High Voltage: 1125 Window: 4.42 Thrshld: 2.20

Detector S/N: 041533 Source ID/SN: Ra^{226}/GS-04 Source Activity: 59.3 KpCi

Blank Canister Bkgd. Range, cpm: 2 σ = 119 to 158 3 σ = 110 to 167

Gross Source Range, cpm: 2 σ = 10095 to 10481 3 σ = 9998 to 10578

Technician: DL Cogr

All counts times are one minute.

	Date	By	Background Counts (1 min. each)				Source Counts (1 min. each)				ok?
			#1	#2	#3	Avg.	#1	#2	#3	Average	Y/N
Pre	10/21/12	DLCogr	127	151	136	138	10346	10395	10371	10371	Y
Post	10/21/12	DLCogr	141	142	144	142	10416	10147	10201	10255	Y
Pre	10/22/12	DLCogr	144	131	145	140	10404	10253	10350	10336	Y
Post	10/22/12	DLCogr	127	150	153	143	10214	10160	10429	10268	Y

Y/N: Y = average background and source cpm falls within the control limits.
N = average background and source cpm does not fall within the control limits.

The acceptable ranges were determined from prior background and source check data.

CHARCOAL CANISTER ANALYSIS SYSTEM

SITE LOCATION: White Mesa Mill, Blanding, UT

CLIENT: Energy Fuels Resources

Calibration Check Log

System ID: M-01 / D-21 Calibration Date: 6/09/12 Due Date: 6/09/13

Scaler S/N: 51572 High Voltage: 1125 Window: 4.42 Thrshld: 2.20

Detector S/N: 041533 Source ID/SN: Ra^{226}/GS-05 Source Activity: 59.3KpCi

Blank Canister Bkgd. Range, cpm: 2 σ = 119 to 158 3 σ = 110 to 167

Gross Source Range, cpm: 2 σ = 10059 to 10423 3 σ = 9968 to 10514

Technician: D L Cooper

All counts times are one minute.

	Date	By	Background Counts (1 min. each)				Source Counts (1 min. each)				ok?
			#1	#2	#3	Avg.	#1	#2	#3	Average	Y/N
Pre	10/21/12	DLCoop	127	151	136	138	10140	10206	10309	10218	Y
Post	10/21/12	DLCoop	141	142	144	142	10223	10312	10195	10243	Y
Pre	10/22/12	DLCoop	144	131	145	140	10247	10295	10206	10249	Y
Post	10/22/12	DLCoop	127	150	153	143	10154	10438	10236	10276	Y

Y/N: Y = average background and source cpm falls within the control limits.
N = average background and source cpm does not fall within the control limits.

The acceptable ranges were determined from prior background and source check data.

CHARCOAL CANISTER ANALYSIS SYSTEM

SITE LOCATION: White Mesa Mill, Blanding, UT

CLIENT: Energy Fuels Resources

Calibration Check Log

System ID: M-02/D-20 Calibration Date: 6/09/12 Due Date: 6/09/13

Scaler S/N: 51563 High Voltage: 825 Window: 4.42 Thrshld: 2.20

Detector S/N: 041532 Source ID/SN: Ra^{226}/GS-04 Source Activity: 59.3 kpC

Blank Canister Bkgd. Range, cpm: 2 σ = 124 to 152 3 σ = 117 to 159

Gross Source Range, cpm: 2 σ = 10211 to 10605 3 σ = 10113 to 10704

Technician: DL Cooper

All counts times are one minute.

	Date	By	Background Counts (1 min. each)				Source Counts (1 min. each)				ok?
			#1	#2	#3	Avg.	#1	#2	#3	Average	Y/N
Pre	10/21/12	RCoop	148	146	144	146	10603	10586	10569	10586	Y
Post	10/21/12	RCoop	142	151	142	145	10318	10498	10302	10373	Y
Pre	10/22/12	RCoop	136	124	130	130	10593	10247	10490	10443	Y
Post	10/22/12	RCoop	140	126	125	130	10454	10361	10520	10445	Y

Y/N: Y = average background and source cpm falls within the control limits.
N = average background and source cpm does not fall within the control limits.

The acceptable ranges were determined from prior background and source check data.

CHARCOAL CANISTER ANALYSIS SYSTEM

SITE LOCATION: White Mesa Mill, Blanding, UT

CLIENT: Energy Fuels Resources

Calibration Check Log

System ID: M-02/D-20 Calibration Date: 6/09/12 Due Date: 6/09/13

Scaler S/N: 51563 High Voltage: 825 Window: 4.42 Thrshld: 2.20

Detector S/N: 041532 Source ID/SN: Ra^{226}/GS-05 Source Activity: 59.3 KpCi

Blank Canister Bkgd. Range, cpm: 2 σ = 124 to 152 3 σ = 117 to 159

Gross Source Range, cpm: 2 σ = 10031 to 10667 3 σ = 9872 to 10826

Technician: DL Cook

All counts times are one minute.

	Date	By	Background Counts (1 min. each)				Source Counts (1 min. each)				ok?
			#1	#2	#3	Avg.	#1	#2	#3	Average	Y/N
Pre	10/21/12	DLCook	148	146	144	146	10271	10230	10242	10248	Y
Post	10/21/12	DLCook	142	151	142	145	10178	10366	10350	10298	Y
Pre	10/22/12	DLCook	136	124	130	130	10316	10254	10461	10344	Y
Post	10/22/12	DLCook	140	126	125	130	10332	10186	10255	10258	Y

Y/N: Y = average background and source cpm falls within the control limits.
N = average background and source cpm does not fall within the control limits.

The acceptable ranges were determined from prior background and source check data.

Appendix B

Recount Data Analyses

CLIENT: ENERGY FUELS RESOURCES PROJECT: RADON FLUX MEASUREMENTS, WHITE MESA MILL PROJECT NO.: 12004.00

PILE: 2 BATCH: G SURFACE: SOIL AIR TEMP MIN: 39°F WEATHER: NO RAIN
AREA: COVER DEPLOYED: 10 20 12 RETRIEVED: 10 21 12 CHARCOAL BKG: 151 cpm Wt. Out: 180.0 g.
FIELD TECHNICIANS: CS,MC,DLC COUNTED BY: DLC DATA ENTRY BY: DLC TARE WEIGHT: 29.2 g.
COUNTING SYSTEM I.D.: M01/D21, M02/D20 CAL. DUE: 6/10/13

RECOUNT CANISTER ANALYSIS:

GRID LOCATION	SAMPLE I. D.	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	CNT (MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	PRECISION % RPD
G10	G10	8	10	10	21	12	21	6	1	30494	218.8	45.9	4.6	0.03	
RECOUNT	G10	8	10	10	22	12	7	50	1	27635	218.8	45.1	4.5	0.03	1.8%
G20	G20	8	22	10	21	12	21	14	1	14497	216.8	21.8	2.2	0.03	
RECOUNT	G20	8	22	10	22	12	7	50	1	13462	216.8	21.9	2.2	0.03	0.5%
G30	G30	8	35	10	21	12	21	21	1	37861	227.8	57.5	5.8	0.03	
RECOUNT	G30	8	35	10	22	12	7	51	1	34177	227.8	56.1	5.6	0.03	2.5%
G40	G40	8	23	10	21	12	21	29	1	29622	215.7	44.8	4.5	0.03	
RECOUNT	G40	8	23	10	22	12	7	51	1	27551	215.7	45.0	4.5	0.03	0.4%
G50	G50	8	58	10	21	12	21	38	1	9501	220.8	14.3	1.4	0.03	
RECOUNT	G50	8	58	10	22	12	7	53	1	8703	220.8	14.2	1.4	0.03	0.7%
G60	G60	8	46	10	21	12	21	48	1	1715	220.0	2.4	0.2	0.03	
RECOUNT	G60	8	46	10	22	12	7	53	1	1684	220.0	2.5	0.3	0.03	4.1%
G70	G70	9	16	10	21	12	21	56	1	9181	221.7	13.9	1.4	0.03	
RECOUNT	G70	9	16	10	22	12	7	54	1	8142	221.7	13.3	1.3	0.03	4.4%
G80	G80	8	41	10	21	12	22	6	2	1422	224.1	0.86	0.1	0.03	
RECOUNT	G80	8	41	10	22	12	7	55	2	1302	224.1	0.83	0.1	0.03	3.6%
G90	G90	8	15	10	21	12	22	15	2	1236	204.7	0.72	0.1	0.03	
RECOUNT	G90	8	15	10	22	12	7	58	2	1119	204.7	0.68	0.1	0.03	5.7%
G100	G100	8	10	10	21	12	22	24	1	1043	220.7	1.4	0.1	0.03	
RECOUNT	G100	8	10	10	22	12	7	58	2	2051	220.7	1.4	0.1	0.03	0.0%
														AVERAGE PERCENT PRECISION FOR THE CELL 2 COVER REGION:	2.4%

Appendix C

Radon Flux Sample Laboratory Data (including Blanks)

CLIENT: ENERGY FUELS RESOURCES PROJECT: RADON FLUX MEASUREMENTS, WHITE MESA MILL PROJECT NO.: 12004.00

PILE: 2 BATCH: G SURFACE: SOIL AIR TEMP MIN: 39°F WEATHER: NO RAIN
AREA: COVER DEPLOYED: 10 20 12 RETRIEVED: 10 21 12 CHARCOAL BKG: 151 cpm Wt. Out: 180.0 g.
FIELD TECHNICIANS: CS,MC,DLC COUNTED BY: DLC DATA ENTRY BY: DLC TARE WEIGHT: 29.2 g.
COUNTING SYSTEM I.D.: M01/D21, M02/D20 CAL. DUE: 6/10/13

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	CNT (MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	COMMENTS:
G01	G01	8	0	8	23	10	21	12	21	0	1	2850	215.1	4.1	0.4	0.03	
G02	G02	8	1	8	23	10	21	12	21	0	1	25161	214.9	37.9	3.8	0.03	
G03	G03	8	2	8	24	10	21	12	21	1	1	1535	218.5	2.1	0.2	0.03	
G04	G04	8	3	8	24	10	21	12	21	1	1	30744	219.1	46.3	4.6	0.03	
G05	G05	8	4	8	25	10	21	12	21	3	1	1029	217.7	1.3	0.1	0.03	
G06	G06	8	6	8	25	10	21	12	21	3	1	1091	215.7	1.4	0.1	0.03	
G07	G07	8	7	8	30	10	21	12	21	4	1	1802	218.4	2.5	0.3	0.03	
G08	G08	8	8	8	30	10	21	12	21	4	1	25484	216.1	38.3	3.8	0.03	
G09	G09	8	9	8	31	10	21	12	21	6	1	2423	220.8	3.5	0.3	0.03	
G10	G10	8	10	8	31	10	21	12	21	6	1	30494	218.8	45.9	4.6	0.03	
G11	G11	8	11	8	32	10	21	12	21	8	1	6997	216.3	10.5	1.0	0.03	
G12	G12	8	13	8	32	10	21	12	21	8	1	28791	219.5	43.4	4.3	0.03	
G13	G13	8	14	8	33	10	21	12	21	9	1	9633	215.0	14.5	1.5	0.03	
G14	G14	8	15	8	33	10	21	12	21	9	1	17487	212.9	26.3	2.6	0.03	
G15	G15	8	16	8	38	10	21	12	21	11	1	8310	215.6	12.5	1.2	0.03	
G16	G16	8	17	8	38	10	21	12	21	11	1	4776	217.8	7.0	0.7	0.03	
G17	G17	8	18	8	39	10	21	12	21	12	1	26906	216.0	40.9	4.1	0.03	
G18	G18	8	20	8	39	10	21	12	21	12	1	21256	217.0	32.0	3.2	0.03	
G19	G19	8	21	8	40	10	21	12	21	14	1	15945	216.3	24.2	2.4	0.03	
G20	G20	8	22	8	40	10	21	12	21	14	1	14497	216.8	21.8	2.2	0.03	
G21	G21	8	45	8	50	10	21	12	21	15	1	1475	216.5	2.0	0.2	0.03	
G22	G22	8	44	8	50	10	21	12	21	15	1	23981	217.0	36.4	3.6	0.03	
G23	G23	8	43	8	49	10	21	12	21	17	1	1445	217.1	2.0	0.2	0.03	
G24	G24	8	42	8	49	10	21	12	21	17	1	20249	216.7	30.7	3.1	0.03	
G25	G25	8	41	8	48	10	21	12	21	18	1	26609	216.4	40.8	4.1	0.03	
G26	G26	8	39	8	48	10	21	12	21	18	1	25669	217.4	38.9	3.9	0.03	
G27	G27	8	38	8	47	10	21	12	21	20	1	4162	217.0	6.2	0.6	0.03	
G28	G28	8	37	8	47	10	21	12	21	20	1	41814	215.2	63.5	6.4	0.03	
G29	G29	8	36	8	46	10	21	12	21	21	1	29056	220.3	44.6	4.5	0.03	
G30	G30	8	35	8	46	10	21	12	21	21	1	37861	227.8	57.5	5.7	0.03	
G31	G31	8	33	8	45	10	21	12	21	23	1	8781	214.8	13.3	1.3	0.03	
G32	G32	8	32	8	45	10	21	12	21	23	1	56615	218.6	86.0	8.6	0.03	
G33	G33	8	31	8	44	10	21	12	21	24	1	9530	218.4	14.4	1.4	0.03	
G34	G34	8	30	8	44	10	21	12	21	24	1	31033	212.8	47.0	4.7	0.03	

CLIENT: ENERGY FUELS RESOURCES PROJECT: RADON FLUX MEASUREMENTS, WHITE MESA MILL PROJECT NO.: 12004.00

PILE: 2 BATCH: G SURFACE: SOIL AIR TEMP MIN: 39°F WEATHER: NO RAIN
AREA: COVER DEPLOYED: 10 20 12 RETRIEVED: 10 21 12 CHARCOAL BKG: 151 cpm Wt. Out: 180.0 g.
FIELD TECHNICIANS: CS,MC,DLC COUNTED BY: DLC DATA ENTRY BY: DLC TARE WEIGHT: 29.2 g.
COUNTING SYSTEM I.D.: M01/D21, M02/D20 CAL. DUE: 6/10/13

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	CNT (MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	COMMENTS:
G35	G35	8	29	8	43	10	21	12	21	26	1	2786	216.8	4.1	0.4	0.03	
G36	G36	8	28	8	43	10	21	12	21	26	1	38360	218.0	58.1	5.8	0.03	
G37	G37	8	27	8	42	10	21	12	21	27	1	28609	216.4	43.8	4.4	0.03	
G38	G38	8	25	8	42	10	21	12	21	27	1	34545	219.6	52.3	5.2	0.03	
G39	G39	8	24	8	41	10	21	12	21	29	1	30051	218.1	46.0	4.6	0.03	
G40	G40	8	23	8	41	10	21	12	21	29	1	29622	215.7	44.8	4.5	0.03	
G41	G41	9	9	9	8	10	21	12	21	31	1	43661	215.5	67.4	6.7	0.03	
G42	G42	9	7	9	8	10	21	12	21	31	1	10749	218.3	16.2	1.6	0.03	
G43	G43	9	6	9	7	10	21	12	21	32	1	10122	223.7	15.4	1.5	0.03	
G44	G44	9	5	9	7	10	21	12	21	32	1	59191	217.1	90.3	9.0	0.03	
G45	G45	9	4	9	6	10	21	12	21	34	1	67615	221.1	104.4	10.4	0.03	
G46	G46	9	3	9	6	10	21	12	21	34	1	4000	221.9	5.9	0.6	0.03	
G47	G47	9	2	9	1	10	21	12	21	36	1	14649	220.1	22.5	2.3	0.03	
G48	G48	9	0	9	1	10	21	12	21	36	1	1886	218.6	2.7	0.3	0.03	
G49	G49	8	59	9	0	10	21	12	21	38	1	18155	220.0	27.9	2.8	0.03	
G50	G50	8	58	9	0	10	21	12	21	38	1	9501	220.8	14.3	1.4	0.03	
G51	G51	8	57	8	59	10	21	12	21	40	1	40596	220.7	62.7	6.3	0.03	
G52	G52	8	56	8	59	10	21	12	21	40	1	14789	220.5	22.4	2.2	0.03	
G53	G53	8	55	8	58	10	21	12	21	42	1	114058	219.7	176.6	17.7	0.03	
G54	G54	8	53	8	58	10	21	12	21	42	1	31928	221.1	48.7	4.9	0.03	
G55	G55	8	52	8	53	10	21	12	21	43	1	3964	221.7	5.9	0.6	0.03	
G56	G56	8	51	8	53	10	21	12	21	43	1	166533	217.8	255.4	25.5	0.03	
G57	G57	8	50	8	52	10	21	12	21	44	1	44995	214.9	69.6	7.0	0.03	
G58	G58	8	49	8	52	10	21	12	21	46	2	1777	214.1	1.1	0.1	0.03	
G59	G59	8	48	8	51	10	21	12	21	49	2	1682	220.8	1.1	0.1	0.03	
G60	G60	8	46	8	51	10	21	12	21	48	1	1715	220.0	2.4	0.2	0.03	
G61	G61	9	10	9	9	10	21	12	21	51	1	5321	215.9	8.0	0.8	0.03	
G62	G62	9	11	9	9	10	21	12	21	51	1	4843	218.1	7.2	0.7	0.03	
G63	G63	9	12	9	10	10	21	12	21	52	1	2899	218.2	4.3	0.4	0.03	
G64	G64	9	13	9	10	10	21	12	21	52	1	60882	215.3	93.4	9.3	0.03	
G65	G65	9	14	9	11	10	21	12	21	53	1	21907	216.6	33.8	3.4	0.03	
G66	G66	9	16	9	11	10	21	12	21	53	1	23204	214.7	35.5	3.6	0.03	
G67	G67	9	17	9	12	10	21	12	21	55	1	17439	217.1	26.9	2.7	0.03	
G68	G68	9	18	9	12	10	21	12	21	55	1	3672	223.1	5.4	0.5	0.03	

CLIENT: ENERGY FUELS RESOURCES PROJECT: RADON FLUX MEASUREMENTS, WHITE MESA MILL PROJECT NO.: 12004.00

PILE: 2 BATCH: G SURFACE: SOIL AIR TEMP MIN: 39°F WEATHER: NO RAIN
AREA: COVER DEPLOYED: 10 20 12 RETRIEVED: 10 21 12 CHARCOAL BKG: 151 cpm Wt. Out: 180.0 g.
FIELD TECHNICIANS: CS,MC,DLC COUNTED BY: DLC DATA ENTRY BY: DLC TARE WEIGHT: 29.2 g.
COUNTING SYSTEM I.D.: M01/D21, M02/D20 CAL. DUE: 6/10/13

GRID LOCATION	SAMPLE I. D.	DEPLOY HR	DEPLOY MIN	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	CNT (MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	COMMENTS:
G69	G69	9	18	9	12	10	21	12	21	56	1	4825	221.1	7.3	0.7	0.03	
G70	G70	9	16	9	11	10	21	12	21	56	1	9181	221.7	13.9	1.4	0.03	
G71	G71	9	14	9	9	10	21	12	21	58	1	16841	221.9	26.0	2.6	0.03	
G72	G72	9	12	9	8	10	21	12	21	58	1	24565	222.0	37.6	3.8	0.03	
G73	G73	9	10	9	7	10	21	12	21	59	1	5665	215.9	8.6	0.9	0.03	
G74	G74	9	8	9	5	10	21	12	21	59	1	13117	222.4	20.0	2.0	0.03	
G75	G75	9	6	9	4	10	21	12	22	1	1	1374	225.2	1.9	0.2	0.03	
G76	G76	9	4	9	3	10	21	12	22	1	1	1314	222.1	1.8	0.2	0.03	
G77	G77	8	35	8	44	10	21	12	22	2	1	43794	217.9	67.7	6.8	0.03	
G78	G78	8	37	8	45	10	21	12	22	3	2	1577	218.6	1.0	0.1	0.03	
G79	G79	8	39	8	46	10	21	12	22	5	1	4083	216.6	6.1	0.6	0.03	
G80	G80	8	41	8	48	10	21	12	22	6	2	1422	224.1	0.9	0.1	0.03	
G81	G81	8	43	8	49	10	21	12	22	8	1	5110	218.7	7.7	0.8	0.03	
G82	G82	8	45	8	50	10	21	12	22	8	1	20896	222.5	31.9	3.2	0.03	
G83	G83	8	47	8	52	10	21	12	22	10	1	21298	220.8	32.9	3.3	0.03	
G84	G84	8	49	8	53	10	21	12	22	10	1	2376	220.9	3.4	0.3	0.03	
G85	G85	8	51	8	54	10	21	12	22	11	1	4500	224.1	6.8	0.7	0.03	
G86	G86	8	53	8	56	10	21	12	22	11	1	5548	223.1	8.3	0.8	0.03	
G87	G87	8	55	8	57	10	21	12	22	12	1	3165	215.3	4.7	0.5	0.03	
G88	G88	8	57	8	58	10	21	12	22	12	1	6027	221.3	9.1	0.9	0.03	
G89	G89	8	13	8	29	10	21	12	22	14	1	4285	220.6	6.4	0.6	0.03	
G90	G90	8	15	8	30	10	21	12	22	15	2	1236	204.7	0.7	0.1	0.03	
G91	G91	8	17	8	31	10	21	12	22	18	2	1625	219.0	1.0	0.1	0.03	
G92	G92	8	19	8	33	10	21	12	22	17	1	2232	221.5	3.2	0.3	0.03	
G93	G93	8	21	8	34	10	21	12	22	20	1	6642	224.6	10.1	1.0	0.03	
G94	G94	8	23	8	35	10	21	12	22	20	1	4384	221.1	6.5	0.7	0.03	
G95	G95	8	26	8	37	10	21	12	22	21	1	2475	224.6	3.6	0.4	0.03	
G96	G96	8	28	8	38	10	21	12	22	21	1	4840	220.4	7.2	0.7	0.03	
G97	G97	8	30	8	39	10	21	12	22	23	1	27993	220.9	43.3	4.3	0.03	
G98	G98	8	0	8	25	10	21	12	22	23	1	9403	215.9	14.1	1.4	0.03	
G99	G99	8	7	8	26	10	21	12	22	24	1	1255	216.1	1.7	0.2	0.03	
G100	G100	8	10	8	27	10	21	12	22	24	1	1043	220.7	1.4	0.1	0.03	

AVERAGE RADON FLUX RATE FOR THE CELL 2 COVER REGION: 27.7 pCi/m²s

CLIENT: ENERGY FUELS RESOURCES PROJECT: RADON FLUX MEASUREMENTS, WHITE MESA MILL PROJECT NO.: 12004.00

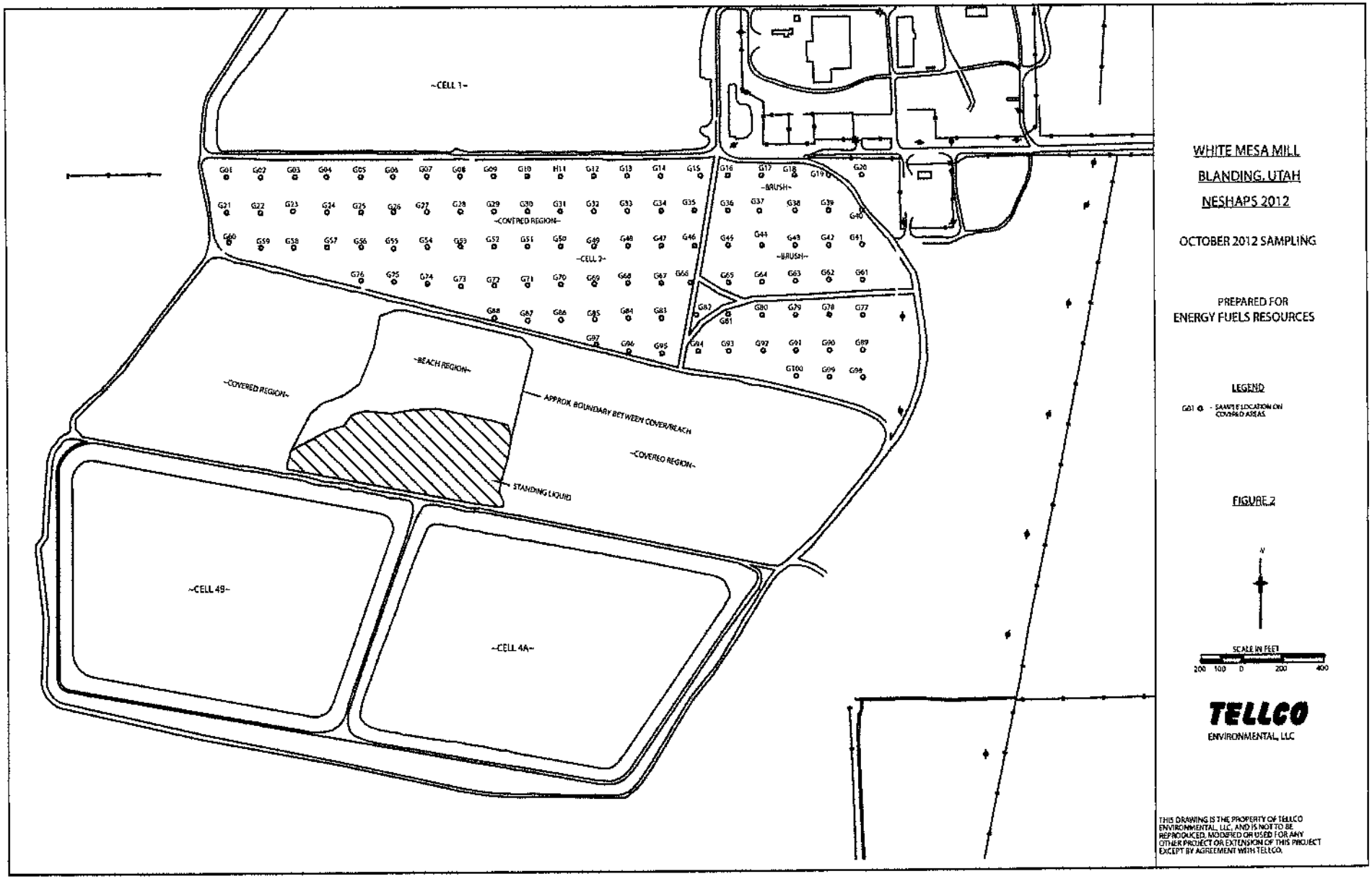
PILE: 2 BATCH: G SURFACE: SOIL AIR TEMP MIN: 39°F WEATHER: NO RAIN
AREA: COVER DEPLOYED: 10 20 12 RETRIEVED: 10 21 12 CHARCOAL BKG: 151 cpm Wt. Out: 180.0 g.
FIELD TECHNICIANS: CS,MC,DLC COUNTED BY: DLC DATA ENTRY BY: DLC TARE WEIGHT: 29.2 g.
COUNTING SYSTEM I.D.: M01/D21, M02/D20 CAL. DUE: 6/10/13

BLANK CANISTER ANALYSIS:

GRID LOCATION	SAMPLE I. D.	RETRIV HR	RETRIV MIN	ANALYSIS MO	ANALYSIS DA	ANALYSIS YR	MID-TIME HR	MID-TIME MIN	CNT (MIN)	GROSS COUNTS	GROSS WT IN	RADON pCi/m²s	± pCi/m²s	LLD pCi/m²s	COMMENTS:
G BLANK 1	G BLANK 1	7	30	8	10	10	21	12	18	28	10	1877	205.7	0.05	0.02	0.03	CONTROL
G BLANK 2	G BLANK 2	7	30	8	10	10	21	12	18	28	10	1820	205.5	0.05	0.02	0.03	CONTROL
G BLANK 3	G BLANK 3	7	30	8	10	10	21	12	18	41	10	1806	207.5	0.04	0.02	0.03	CONTROL
G BLANK 4	G BLANK 4	7	30	8	10	10	21	12	18	41	10	1814	207.8	0.04	0.02	0.03	CONTROL
G BLANK 5	G BLANK 5	7	30	8	10	10	21	12	18	55	10	1883	207.6	0.06	0.02	0.03	CONTROL
AVERAGE BLANK CANISTER ANALYSIS FOR THE CELL 2 COVER REGION:														0.05	pCi/m²s		

Appendix D

Sample Locations Map (Figure 2)



WHITE MESA MILL

BLANDING, UTAH

NESHAPS 2012

OCTOBER 2012 SAMPLING

PREPARED FOR
ENERGY FUELS RESOURCES

LEGEND

G01 ⊕ - SAMPLE LOCATION ON COVERED AREAS

FIGURE 2

N

SCALE IN FEET
200 100 0 200 400

TELLCO
ENVIRONMENTAL, LLC

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ATTACHMENT 1D

Tellco Report on Annual Radon Flux Monitoring
November 2012

National Emission Standards for Hazardous Air Pollutants
2012 Radon Flux Measurement Program
White Mesa Mill
6425 South Highway 191
Blanding, Utah 84511

November 2012 Sampling Results

Prepared for: Energy Fuels Resources (USA) Inc.
6425 S. Highway 191
P.O. Box 809
Blanding, Utah 84511

Prepared by: Tellco Environmental
P.O. Box 3987
Grand Junction, Colorado 81502

TABLE OF CONTENTS

1. INTRODUCTION

During November 19-20, 2012, Tellco Environmental, LLC (Tellco) of Grand Junction, Colorado, provided support to Energy Fuels Resources (USA) Inc. (Energy Fuels) to conduct additional radon flux measurements regarding the required National Emission Standards for Hazardous Air Pollutants (NESHAPs) Radon Flux Measurements. These measurements are required of Energy Fuels to show compliance with Federal Regulations (further discussed in Section 3 below). The standard is not an average per facility, but is an average per radon source. The standard allows mill owners or operators the option of either making a single set of measurements or making measurements over a one year period (e.g., weekly, monthly, or quarterly intervals).

Radon flux measurements were initially performed in June 2012 on Cell 2 and Cell 3 with the intention of performing a single set of measurements to represent the year 2012 as allowed by the regulations (Method 115). The results of the June 2012 sampling (presented in a separate report) measured an arithmetic average radon flux rate of 23.1 picoCuries per square meter per second (pCi/m2-s) for Cell 2 and 18.0 pCi/m2-s for Cell 3. Because the results for Cell 2 exceeded the regulatory standard of 20 pCi/m2-s, Energy Fuels directed Tellco to perform additional radon flux measurements of Cell 2 in September, October, and November 2012. This report addresses the results of the November 2012 sampling while the June, September, and October 2012 sampling results are each presented in separate reports. No additional sampling of Cell 3 was performed because the average radon flux rate measured by the June 2012 sampling was below the regulatory standard.

Tellco was contracted to provide radon canisters, equipment, and canister placement personnel as well as lab analysis of samples for calendar year 2012. Energy Fuels personnel provided support for loading and unloading charcoal from the canisters. This report includes the procedures employed by Energy Fuels and Tellco to obtain the results presented in Section 9.0 of this report.

2. SITE DESCRIPTION

The White Mesa Mill facility is located in San Juan County in southeastern Utah, six miles south of Blanding, Utah. The mill began operations in 1980 for the purpose of extracting uranium and vanadium from feed stocks. Processing effluents from the operation are deposited in four lined cells, which vary in depth. Cell 1, Cell 4A, and Cell 4B did not require radon flux sampling, as explained in Section 3 below.

Cell 2, which has a total area of approximately 270,624 square meters (m^2), has been filled and covered with interim cover. This cell was comprised of one region; a soil cover of varying thickness, which required NESHAPs radon flux monitoring. The Cell 2 cover region was the same size in 2012 as it was in 2011. There were no exposed tailings or standing liquid within Cell 2.

Cell 3, which has a total area of 288,858 m^2, is nearly filled with tailings sand and is undergoing pre-closure activities. This cell was comprised of two source regions that required NESHAPs radon monitoring: at the time of the June 2012 radon sampling, approximately 219,054 m^2 of the cell had a soil cover of varying thickness and approximately 36,233 m^2 of exposed tailings "beaches". The remaining approximately 33,571 m^2 was covered by standing liquid in lower elevation areas. The

standing liquid area was much smaller than in 2011. Raffinate crystals and residue from the repair of the original Cell 4A in 2006 have been placed in Cell 3.

The Cell 3 cover region area was larger during the 2012 radon flux sampling than it was for the 2011 sampling program. Due to worker health and safety concerns by both Energy Fuels and Tellco personnel, portions of the unstable and wet beaches and covered areas were not sampled. The areas tested for radon emanation are representative of the disposition of tailings for the 2012 reporting period.

3. REGULATORY REQUIREMENTS FOR THE SITE

Radon emissions from the uranium mill tailings at this site are regulated by the State of Utah's Division of Radiation Control and administered by the Utah Division of Air Quality under generally applicable standards set by the Environmental Protection Agency (EPA) for Operating Mills. Applicable regulations are specified in 40 CFR Part 61, Subpart W, National Emission Standards for Radon Emissions from Operating Mill Tailings, with technical procedures in Appendix B. At present, there are no Subpart T uranium mill tailings at this site. These regulations are a subset of the NESHAPs. According to subsection 61.252 Standard, (a) radon-222 emissions to ambient air from an existing uranium mill tailings pile shall not exceed an average of 20 picoCuries per square meter per second (pCi/m2-s) for each pile or region. Subsection 61.253, Determining Compliance, states that: "Compliance with the emission standard in this subpart shall be determined annually through the use of Method 115 of Appendix B." The repaired Cell 4A, and newly constructed Cell 4B, were both constructed after December 15, 1989 and each was constructed with less than 40 acres surface area. Cell 4A and 4B comply with the requirements of 40 CFR 61.252(b), therefore no radon flux measurements are required on either Cell 4A or 4B.

4. SAMPLING METHODOLOGY

Radon emissions were measured using Large Area Activated Charcoal Canisters (canisters) in conformance with 40 CFR, Part 61, Appendix B, Method 115, Restrictions to Radon Flux Measurements, (EPA, 2012). These are passive gas adsorption sampling devices used to determine the flux rate of radon-222 gas from a surface. The canisters were constructed using a 10-inch diameter PVC end cap containing a bed of 180 grams of activated, granular charcoal. The prepared charcoal was placed in the canisters on a support grid on top of a ½ inch thick layer of foam and secured with a retaining ring under 1½ inches of foam (see Figure 1, page 11).

One hundred sampling locations were distributed throughout Cell 2 (which consisted of one region) as depicted on the Sample Locations Map (see Figure 2, Appendix D). Each charged canister was placed directly onto the surface (open face down) and exposed to the surface for 24 hours. Radon gas adsorbed onto the charcoal and the subsequent radioactive decay of the entrained radon resulted in radioactive lead-214 and bismuth-214. These radon progeny isotopes emit characteristic gamma photons that can be detected through gamma spectroscopy. The original total activity of the adsorbed radon was calculated from these gamma ray measurements using calibration factors derived from cross-calibration of standard sources containing known total activities of radium-226 with geometry identical to the counted samples and from the principles of radioactive decay.

After 24 hours, the exposed charcoal was transferred to a sealed plastic sample container (to prevent radon loss and/or further exposure during transport), identified and labeled, and transported to the

Tellco laboratory in Grand Junction, Colorado for analysis. Upon completion of on-site activities, the field equipment was alpha and beta-gamma scanned for possible contamination resulting from fieldwork activities. All field equipment was surveyed by Energy Fuels Radiation Safety personnel and released for unrestricted use. Tellco personnel maintained custody of the samples from collection through analysis.

5. FIELD OPERATIONS

5.1 Equipment Preparation

All charcoal was dried at 110°C before use in the field. Unused charcoal and recycled charcoal were treated the same. 180-gram aliquots of dried charcoal were weighed and placed in sample containers.

Proper balance operation was verified daily by checking a standard weight. The balance readout agreed with the known standard weight to within ± 0.1 percent.

After acceptable balance check, empty containers were individually placed on the balance and the scale was re-zeroed with the container on the balance. Unexposed and dried charcoal was carefully added to the container until the readout registered 180 grams. The lid was immediately placed on the container and sealed with plastic tape. The balance was checked for readout drift between readings.

Sealed containers with unexposed charcoal were placed individually in the shielded counting well, with the bottom of the container centered over the detector, and the background count rate was documented. Three five-minute background counts were conducted on ten percent of the containers, selected at random to represent the "batch". If the background counts were too high to achieve an acceptable lower limit of detection (LLD), the entire charcoal batch was labeled non-conforming and recycled through the heating/drying process.

5.2 Sample Locations, Identification, and Placement

On November 19, 2012, the sampling locations were spread out throughout the Cell 2 region. The same original designated sample point locations that were established for the June 2012 sampling of Cell 2 were used for the October sampling. A sample identification number (ID) was assigned to every sample point, using a sequential alphanumeric system indicating the charcoal batch and physical location within the region (e.g., I01...I100). This ID was written on an adhesive label and affixed to the top of the canister. The sample ID, date, and time of placement were recorded on the radon flux measurements data sheets for the set of one hundred measurements.

Prior to placing a canister at each sample location, the retaining ring, screen, and foam pad of each canister were removed to expose the charcoal support grid. A pre-measured charcoal charge was selected from a batch, opened and distributed evenly across the support grid. The canister was then reassembled and placed face down on the surface at each sampling location. Care was exercised not to push the device into the soil surface. The canister rim was "sealed" to the surface using a berm of local borrow material.

Five canisters (blanks) were similarly processed and the canisters were kept inside an airtight plastic bag during the 24-hour testing period.

5.3 Sample Retrieval

On November 20, 2012 at the end of the 24-hour testing period, all canisters were retrieved, disassembled and each charcoal sample was individually poured through a funnel into a container. Identification numbers were transferred to the appropriate container, which was sealed and placed in a box for transport. Retrieval date and time were recorded on the same data sheets as the sample placement information. The blank samples were similarly processed.

During the retrieval process, two of the canisters (I15 and I48) placed throughout the Cell 2 sampling region were dropped, spilling the charcoal samples from those canisters. The charcoal samples from the remaining 98 canisters were successfully containerized during the unloading process.

5.4 Environmental Conditions

A rain gauge was in place at the White Mesa Mill site to monitor rainfall and air temperatures during sampling in order to ensure compliance with the regulatory measurement criteria.

In accordance with 40 CFR, Part 61, Appendix B, Method 115:

- Measurements were not initiated within 24 hours of rainfall.
- No rainfall occurred during any of the sampling periods.

6. SAMPLE ANALYSIS

6.1 Apparatus

Apparatus used for the analysis:

- Single- or multi-channel pulse height analysis system, Ludlum Model 2200 with a Teledyne 3" x 3" sodium iodide, thallium-activated (NaI(Tl)) detector.
- Lead shielded counting well approximately 40 cm deep with 5-cm thick lead walls and a 7-cm thick base and 5 cm thick top.
- National Institute of Standards and Technology (NIST) traceable aqueous solution radium-226 absorbed onto 180 grams of activated charcoal.
- Ohaus Model C501 balance with 0.1-gram sensitivity.

6.2 Sample Inspection and Documentation

Once in the laboratory, the integrity of each charcoal container was verified by visual inspection of the plastic container. Laboratory staff documented damaged or unsealed containers and verified that the data sheet was complete.

All of the 98 sample containers and 5 blank containers received and inspected at the Tellco analytical laboratory were verified as valid.

6.3 Background and Sample Counting

The gamma ray counting system was checked daily, including background and radium-226 source measurements prior to and after each counting session. Based on calibration statistics, using two sources with known radium-226 content, background and source control limits were established for each Ludlum/Teledyne counting system with shielded well (see Appendix A).

Gamma ray counting of exposed charcoal samples included the following steps:

- The length of count time was determined by the activity of the sample being analyzed, according to a data quality objective of a minimum of 1,000 accrued counts for any given sample.
- The sample container was centered on the NaI detector and the shielded well door was closed.
- The sample was counted over a determined count length and then the mid-sample count time, date, and gross counts were documented on the radon flux measurements data sheet and used in the calculations.
- The above steps were repeated for each exposed charcoal sample.
- Approximately 10 percent of the containers counted were selected for recounting. These containers were recounted within a few days following the original count.

7. QUALITY CONTROL (QC) AND DATA VALIDATION

Charcoal flux measurement QC samples included the following intra-laboratory analytical frequency objectives:

- Blanks, 5 percent, and
- Recounts, 10 percent

All sample data were subjected to validation protocols that included assessments of sensitivity, precision, accuracy, and completeness. All method-required data quality objectives (EPA, 2012) were attained.

7.1 Sensitivity

A total of five blanks were analyzed by measuring the radon progeny activity in samples subjected to all aspects of the measurement process, excepting exposure to the source region. These blank sample measurements comprised approximately 5 percent of the field measurements. The results of the blank sample radon flux rates ranged from 0.02 to 0.04 pCi/m^2-s, with an average of approximately 0.03 pCi/m^2-s.

7.2 Precision

Ten recount measurements, distributed throughout the sample set, were performed by replicating analyses of individual field samples (see Appendix B). These recount measurements comprised approximately 10 percent of the total number of samples analyzed. The precision of all recount

measurements, expressed as relative percent difference (RPD), ranged from less than 1 percent to 9.5 percent with an overall average precision of approximately 3.8 percent.

7.3 Accuracy

Accuracy of field measurements was assessed daily by counting two laboratory control samples with known Ra-226 content. Accuracy of these lab control sample measurements, expressed as percent bias, ranged from approximately -2.5 percent to +2.5 percent. The arithmetic average bias of the lab control sample measurements was approximately -0.3 percent (see Appendix A).

7.4 Completeness

Ninety-eight samples from the Cell 2 Cover Region were verified, representing 98 percent completeness for the November 2012 radon flux sampling.

8. CALCULATIONS

Radon flux rates were calculated for charcoal collection samples using calibration factors derived from cross-calibration to sources with known total activity with identical geometry as the charcoal containers. A yield efficiency factor was used to calculate the total activity of the sample charcoal containers. Individual field sample result values presented were not reduced by the results of the field blank analyses.

In practice, radon flux rates were calculated by a database computer program. The algorithms utilized by the data base program were as follows:

Equation 8.1:

$$\text{pCi Rn-222/m}^2\text{sec} = \frac{N}{[Ts*A*b*0.5^{(d/91.75)}]}$$

where: N = net sample count rate, cpm under 220-662 keV peak
Ts = sample duration, seconds
b = instrument calibration factor, cpm per pCi; values used:
0.1708, for M-01/D-21 and
0.1727, for M-02/D-20
d = decay time, elapsed hours between sample mid-time and count mid-time
A = area of the canister, m^2

Equation 8.2:

$$\text{Error},2\sigma = 2\times \frac{\sqrt{\frac{\text{Gross Sample, cpm}}{\text{Sample Count, t, min}} + \frac{\text{Background Sample, cpm}}{\text{Background Count, t, min}}}}{\text{Net, cpm}} \times \text{Sample Concentration}$$

Equation 8.3:

$$LLD = \frac{2.71 + (4.65)(S_b)}{[Ts*A*b*0.5^{(d/91.75)}]}$$

where: 2.71 = constant
4.65 = confidence interval factor
S_b = standard deviation of the background count rate
Ts = sample duration, seconds
b = instrument calibration factor, cpm per pCi; values used:
0.1708, for M-01/D-21 and
0.1727, for M-02/D-20
d = decay time, elapsed hours between sample mid-time and count mid-time
A = area of the canister, m^2

9. RESULTS

9.1 Mean Radon Flux

Referencing 40 CFR, Part 61, Subpart W, Appendix B, Method 115 - Monitoring for Radon-222 Emissions, Subsection 2.1.7 - Calculations, "the mean radon flux for each region of the pile and for the total pile shall be calculated and reported as follows:

(a) The individual radon flux calculations shall be made as provided in Appendix A EPA 86(1). The mean radon flux for each region of the pile shall be calculated by summing all individual flux measurements for the region and dividing by the total number of flux measurements for the region.

(b) The mean radon flux for the total uranium mill tailings pile shall be calculated as follows:

$$J_s = \frac{J_1A_1 + \ldots J_2A_2 [+] \ldots J_iA_i}{A_t}$$

Where: J_s = Mean flux for the total pile (pCi/m^2-s)
J_i = Mean flux measured in region i (pCi/m^2-s)
A_i = Area of region i (m^2)
A_t = Total area of the pile (m^2)"

40 CFR 61, Subpart W, Appendix B, Method 115, Subsection 2.1.8, Reporting states "The results of individual flux measurements, the approximate locations on the pile, and the mean radon flux for each region and the mean radon flux for the total stack [pile] shall be included in the emission test report. Any condition or unusual event that occurred during the measurements that could significantly affect the results should be reported."

9.2 Site Results

Site Specific Sample Results (reference Appendix C)

(a) The mean radon flux for each region within the site as follows:

Cell 2 - Cover Area = 26.1 pCi/m^2-s (based on 270,624 m^2 area)

Note: Reference Appendix C of this report for the entire summary of individual measurement results.

(b) Using the data presented above, the calculated mean radon flux for each cell (pile) is, as follows:

Cell 2 = 26.1 pCi/m^2-s

$$\frac{(26.1)(270,624)}{270,624} = 26.1$$

As shown above, the arithmetic mean radon flux of the November 2012 samples for Cell 2 at Energy Fuels White Mesa milling facility is slightly above the NRC and EPA standard of 20 pCi/m^2-s. The unusually dry weather which was especially severe in 2012 likely lowered the water table at the site as well as reducing the moisture content in surface soils. It is believed that this likely increased the radon flux rates over the previous years' reported results. Appendix C is a summary of individual measurement results, including blank sample analysis. Sample locations are depicted on Figure 2, which is included in Appendix D. The map was produced by Tellco.

References

U. S. Environmental Protection Agency, *Radon Flux Measurements on Gardinier and Royster Phosphogypsum Piles Near Tampa and Mulberry, Florida*, EPA 520/5-85-029, NTIS #PB86-161874, January 1986.

U. S. Environmental Protection Agency, *Title 40, Code of Federal Regulations*, July 2012.

U. S. Nuclear Regulatory Commission, *Radiological Effluent and Environmental Monitoring at Uranium Mills*, Regulatory Guide 4.14, April 1980.

U. S. Nuclear Regulatory Commission, *Title 10, Code of Federal Regulations*, Part 40, Appendix A, January 2012.

Figure 1

Large Area Activated Charcoal Canisters Diagram

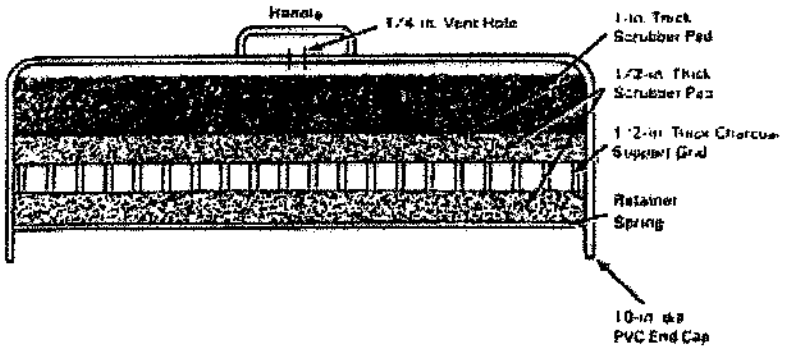

FIGURE 1 Large-Area Radon Collector